

THE AERO-TECH SOLUTION

Aero-Tech Bonded Ceramic Linings

Groupline introduced Aero-Tech bonded ceramic linings to the South African wear protection market to enhance the fracture toughness of their Alumina ceramic tiles and to improve performance in dynamic applications. The tested high shear strength enables designers to reduce the thickness of steel by replacing a portion of the thickness with Alumina, which is fifty percent lighter. When used on rotating components, Aero-Tech bonding allows ceramic-faced blades to flex and bend. Aero-Tech has provided significant savings at the Manganese Metal Company.

The Manganese Metal Company Aero-Tech Solution

Manganese Metal Company produces Electrolytic Manganese Metal. The plant consists of a dry and a wet section. In the dry section, the material conveyance is done using screws. This is basically a motorised auger pushing the material forward to the next section. There are more than 20 screws in operation. The milled ore and calcine is highly abrasive and under normal conditions these screws can require replacement after as little as 6 months of operation.



For this job Groupline protected one screw and after more than 3 years in operation, the screw is showing some signs of wear, but can still be used. The initial installation was also done to determine the following:

- Whether Aero-Tech bonding would be able to withstand the temperature in the process of up to 80°C
- If the ceramic tiles would be able to withstand the shocks when the operators cleaned the screws. During which process the tiles could be exposed to metal objects and severe hammering
- If the tiles would last in the abrasive conditions and prolong the life of the screws

As can be seen in the photograph, the application is successful and has definitely increased the useable lifetime of the screw. A decision has now been taken to Aero-Tech all the screws in the dry section. Although the flights of the screw now last longer, the shaft section started to show signs of abrasion and this could lead to failure as the shaft is the part transferring the rotational energy to the screw. The shaft section will in future also be covered with the ceramic tiles to improve the lifetime even further.

The cost breakdown per screw is as follows:

	Screw without Aero-Tech	Screw with Aero-Tech
Manufacturing of the screw	R 15,200	R 15,200
Ceramic tiles		R 8,450
Installation	R 4,200	R 4,200
Consumables (Bearings etc)	R 1,700	R 1,700
Annualised total cost	R 42,200 per year (Two changes per year)	R 9,850 per year (one change every three years)
Annualised Downtime	Up to 16 hours per screw	Up to 8 hours every three years

Taking into account that there are more than 20 screws in operation, the savings are considerable. It must also be taken into account that the screws are normally opened during every shut to inspect and determine the usage left to end of life. With the Aero-Tech solution, this will not be required and therefore the period of each shutdown can be shortened considerably.